

Patent claims:

1. Method for fabricating semiconductor circuit modules (31) having the following steps:

5

application of a patterned connection layer (11) to a transfer substrate (10);

10 application of active circuit devices (12) and/or passive circuit devices (13) with contact areas (12', 13') pointing toward the transfer substrate (10) to the patterned connection layer (11);

15 connection of the circuit devices (12, 13) to one another by means of a filler (14) at least between the circuit devices (12, 13);

removal of the transfer substrate (10); and

20 application of electrical connection devices (16) for selective contact-connection of the contact areas (12', 13') of the circuit devices (12, 13) to one another.

25 2. Method according to Claim 1, characterized in that a protection device (17) is applied at least over a part of the electrical connection device (16).

30 3. Method according to Claim 2, characterized in that a connecting device (19, 28) is provided in regions (23) not covered by the protection device (17).

35 4. Method according to Claims 1 to 3, characterized in that the patterned connection layer (11) is applied in a printing process.

5. Method according to one of the preceding claims,
characterized

in that the circuit devices (12, 13) are arranged on
the patterned connection layer in such a way that the
5 electrical contact areas (12', 13') of the circuit
devices (12, 13) are not located on the patterned
connection layer (11).

6. Method according to one of the preceding claims,
10 characterized

in that the connection layer (11) is not cured until
after the circuit devices (12, 13) have been applied.

7. Method according to one of the preceding claims,
15 characterized

in that, during and/or after the mechanical connection
of the circuit devices (12, 13) to one another, an
encapsulation (15) of the circuit devices (12, 13) is
applied on the side remote from the contact areas
20 (12', 13').

8. Method according to one of the preceding claims,
characterized

in that the application of the filler (14) and/or of
25 the encapsulation (15) is effected in a printing or
casting process.

9. Method according to one of the preceding claims,
characterized

30 in that the filler (14) and/or the encapsulation (15)
is cured in a curing process before the transfer
substrate (10) is removed.

10. Method according to one of the preceding claims,
35 characterized

in that the electrical connection layer (16) is
provided in at least one conductive layer (20, 21) and
has conductor tracks (20) in the x direction and/or
conductor tracks (21) in the y direction with an

interposed insulating layer given a multilayered nature, which are in each case connected to one another selectively by means of vias (25).

5 11. Method according to one of the preceding claims, characterized
in that a plurality of semiconductor circuit modules (31) are fabricated in a parallel process, which modules are separated into module strips (18) or
10 individual semiconductor circuit modules (31) in a subsequent process step.

12. Semiconductor circuit module (31) having:

15 a patterned connection layer (11);

active circuit devices (12) and/or passive circuit devices (13) with contact areas (12', 13') pointing in the direction of the connection layer (11) on the
20 patterned connection layer (11);

a filler (14) at least between the individual circuit devices (12, 13) for the connection of the circuit devices (12, 13) to one another; and

25 an electrical connection device (16) for the selective contact-connection of the contact areas (12', 13') of the circuit devices (12, 13) to one another.

30 13. Semiconductor circuit module according to Claim 12, characterized
in that the semiconductor circuit module (31) has a protection device (17) at least over a part of the
35 electrical connection device (16).

14. Semiconductor circuit module according to Claim 13, characterized

in that the semiconductor circuit module (31) has a connecting device (19, 28) in regions (23) not covered by the protection device (17).

5 15. Semiconductor circuit module according to Claims 12 to 14,
characterized
in that the active circuit devices (12) have
semiconductor devices (12) that have already been
10 positively tested in respect of functioning.

16. Semiconductor circuit module according to Claims 12 to 15,
characterized
15 in that provision is made of an encapsulation (15) of the circuit devices (12, 13) on the side remote from the contact areas (12', 13').

17. Semiconductor circuit module according to Claims 20 12 to 16,
characterized
in that the connection plane (11) comprises a dielectric material such as a polymer, epoxy resin, adhesive, silicone or polyamide.

25 18. Semiconductor circuit module according to Claims 12 to 17,
characterized
in that the filler (14) comprises a non-conductive,
30 curable material such as a polymer, adhesive or silicone.

19. Semiconductor circuit module according to Claim 18,
35 characterized
in that the encapsulation (15) comprises the same material as the filler (14) or the filler (14) has additional properties.

20. Semiconductor circuit module according to Claims 12 to 19,

characterized

in that the electrical connection layer (16) is
5 provided in at least one conductive layer (20, 21) and
has conductor tracks (20) in the x direction and/or
conductor tracks (21) in the y direction with an
interposed insulating layer given a multilayered
nature, which are in each case connected to one another
10 selectively by means of vias (25).

21. Semiconductor circuit module according to Claims 12 to 20,

characterized

15 in that the protection device (17) has a passivation
layer (17) made of a non-conductive material such as a
polymer.

22. Semiconductor circuit module according to Claims 20 12 to 21,

characterized

in that the semiconductor circuit module (31) has at
least one conductive passage (25) from the front side
to the encapsulated rear side (15), by means of which
25 passage a further semiconductor circuit module (31) can
be connected, in particular by means of a conductive
adhesive (26).

23. Semiconductor circuit module according to Claims 30 14 to 22,

characterized

in that the connecting device (19, 28) has an edge
connector (19) or soldering pads provided with solder
balls (28).

35

24. Semiconductor circuit module according to Claims 12 to 23,

characterized

in that the semiconductor circuit module (31) has a total thickness of less than 200 μm , in particular a total thickness of about 100 μm .